

matter introduced have naturally made the book both bulky and expensive to produce. It is to be feared that the consequent high price will place it out of the reach of the ordinary student, to whom, if we may judge by the long section on one-circle goniometry, it would seem mainly to be addressed. Had Dr. Tutton resisted the temptation to figure and describe every piece of elaborate and expensive apparatus which aroused his interest, and had he omitted all the paragraphs which have nothing to do with crystals, the length and cost of the book might have been very considerably reduced, and its accessibility to the student thereby increased, without in the least diminishing its value as a compendium of all that is worth knowing about crystal measurement as practised to-day.

New Editions of Chemical Works.

- (1) *A Dictionary of Applied Chemistry*. By Sir Edward Thorpe. Vol. 3. Revised and enlarged edition. Explosives—Kyrofin. Pp. viii + 735. (London: Longmans, Green and Co., 1922.) 3l. net.
- (2) *Metallography*. By Prof. Cecil H. Desch. (Text-Books of Physical Chemistry.) Third edition. Pp. xi + 440. (London: Longmans, Green and Co., 1922.) 16s. net.
- (3) *A Concise History of Chemistry*. By Dr. T. P. Hilditch. Second edition, revised. Pp. xi + 276. (London: Methuen and Co., Ltd., 1922.) 6s.
- (4) *An Introduction to the Principles of Physical Chemistry from the Standpoint of Modern Atomistics and Thermodynamics*. By Prof. E. W. Washburn. Second edition, revised, enlarged, and reset. Pp. xxviii + 518. (New York and London: McGraw-Hill Book Co., Inc., 1921.) 20s. net.
- (5) *Die Wasserstoffionen-Konzentration: ihre Bedeutung für die Biologie und die Methoden ihrer Messung*. Von Prof. Dr. Leonor Michaelis. (Monographien aus dem Gesamtgebiet der Physiologie der Pflanzen und der Tiere, Band I.) Zweite, völlig umgearbeitete Auflage. Teil 1: Die theoretischen Grundlagen. Pp. xi + 262. (Berlin: J. Springer, 1922.) Germany, 69 marks; England, 8s. 6d.

THE reviewing of new editions is a difficult and somewhat thankless task, if only on account of the detailed comparison which is needed in order to discover the novel features which alone call for comment or criticism. The four works in English of which new editions are here noted are all well known, and it would be superfluous to refer to their obvious merits, except in so far as they have been enhanced by the revision which they have undergone.

(1) The first two volumes of the new edition of the "Dictionary of Applied Chemistry" have received

adequate notice in these columns. The third volume covers the letters F to K, but begins with an article on "Explosives," which has obviously been carried over from the preceding volume on account of its length and importance. In revising this article Mr. Perry has expanded it to nearly 100 pages by including notes on a large number of new explosives which have come into use during the last few years. The article thus continues to fulfil in its own field the main purpose for which a dictionary exists, namely, to provide some information in reference to every topic which may give rise to inquiry. The main lines of development of the manufacture on a very large scale of a few principal explosives during the war are, however, also adequately dealt with, and useful information is given on points such as the preparation, purification, and properties of T.N.T., and its use in the manufacture of amatol. The portion of the dictionary which is included in the present volume has been expanded by nearly one-quarter from 602 to 735 pages, and a somewhat careful comparison of the old and new editions has shown that, almost without exception, each of the important articles has contributed to this expansion. Fresh features of the new edition include an article on the interferometer by H. H. Robinson, and an article on hardened or hydrogenated oils by C. A. Mitchell, while gas warfare forms the subject of a short unsigned article. A completely new article on glass, by Prof. W. E. S. Turner of Sheffield, has replaced the article on the same subject which appeared in the old edition; the illustrations given in the new article of the automatic machines used for the manufacture of bottles are remarkable as suggesting something even more complex than the engine-room of a submarine. Throughout the volume there is evidence of adequate revision, which fully justifies the issue of the new edition.

(2) The third edition of Prof. C. H. Desch's "Metallography" retains all the valuable features on which the reputation of the book has been built. Substantial additions have been made in the chapter on the physical properties of alloys, where important developments which had taken place since 1913, especially in the study of magnetic and electrical properties, are described. Additions have also been made to the chapter on corrosion, in which the recent work by Dr. J. N. Friend in the Journal of the Chemical Society, is now incorporated, together with other work which has appeared in the Journal of the Institute of Metals and the Transactions of the Faraday Society, where a general discussion on this subject is reported. The chapter on the metallography of iron and steel has also been revised, one important new feature being an equilibrium diagram for iron and nickel, in which the changes that take place in the solid metal as it passes

from the non-magnetic into the magnetic condition are represented by lines, which show the formation of a definite series of solid solutions, instead of by blurred areas. The appendix, in which the various binary, ternary, and quaternary systems which have been studied are classified and summarised, has been revised to include publications received down to the time of going to press. The new edition incorporates the results of nine years of work in metallography, and it can be heartily commended for its up-to-date presentation of this important subject.

(3) The first edition of Dr. Hilditch's, "Concise History of Chemistry" was reviewed in NATURE of October 19, 1911, p. 510. The new edition has been expanded from 263 to 276 pages, and, in view of the number of additional topics that have come into prominence during the past ten years, it is clear that the conciseness of the old edition has been at least fully maintained in the new. It will thus be found that the nucleus atom, X-ray analysis of crystals, Moseley's atomic numbers, the octet theory of Langmuir and the discovery of isotopes, are all described in the course of three pages in the chapter on the "Ultimate Constitution of Matter," although another page is given later on to some of these subjects. Gas warfare is described in a paragraph of eleven lines, and "anti-gas" is summed up in a paragraph of four lines. In a few details only the revision is perhaps incomplete, e.g. the list of the metals of the rare earths is still that of 1909, with holmium omitted, and the atomic weights (which are of the same date) might well have been supplemented by giving also the atomic numbers; moreover, the new matter is by no means fully represented in the subject index, although the author-index appears to have been revised. The value of the book as an index of chemical discoveries is preserved in the new edition, although it would obviously be useless to look for detailed descriptions in so compact a volume.

(4) Prof. Washburn's "Principles of Physical Chemistry" was reviewed in these columns on June 1, 1916, p. 277, and has established a wide reputation in this country as well as in the country of its origin. As the first edition appeared but seven years ago, only those subjects which have developed since the war have called for further elaboration. These include, however, the work of Aston on isotopes and all the recent work on atomic and molecular structure. It is, indeed, remarkable evidence of the rapid progress which has been made in this field that, while the first edition stops with an account of the qualitative aspects of the periodic classification, and of the models which Soddy and Harkins put forward in order to explain the sequence of properties, these two figures have disappeared in the second edition in favour of a large chart

illustrating the Lewis-Langmuir theory; and this chart in turn is probably already obsolete in view of the suggestions put forward by Bohr for making use of the quantum-orbits of the electrons as a basis for the periodic classification of the elements. The work on the X-ray analysis of crystal-structure, which was briefly mentioned in the first edition, claims eight pages in the second edition. Anisotropic liquids are, however, inadequately (and perhaps incorrectly) dealt with, especially in view of recent French work on this subject.

(5) Dr. Michaelis's book on "Hydrogen Ion Concentration" was first issued in 1914. The present volume is a new edition of the first and theoretical part of the book, and covers two main topics, namely, the chemical equilibrium of ions and ions as sources of differences of electrical potential. The subject has attracted even more attention from physiologists than from chemists, and Dr. Michaelis's book is actually issued as the first volume of the series of monographs on physiology; but this does not detract from its value to physical chemists, and especially to those who are liable to be called upon to answer the conundrums of their biochemical colleagues.

Phosphatic Fertilisers.

Basic Slags and Rock Phosphates. By Dr. G. Scott Robertson. (Cambridge Agricultural Monographs.) Pp. xvi+120. (Cambridge: At the University Press, 1922.) 14s. net.

DURING and since the war the position in this country with regard to the supply of basic phosphatic fertilisers has undergone a radical change. On one hand, the ousting of the older Bessemer process by the modern open hearth process of steel-making has led to the virtual disappearance from the market of the high grade basic slag to which the agriculturist was accustomed, and its replacement by a totally different material of much lower phosphorus content and frequently of low "citric-solubility." On the other hand, the development of the extensive deposits of rock phosphate in the Pacific Islands has rendered available greatly increased amounts of this material. The field experiments at Cockle Park, from which most of our knowledge of the value of basic slag in agriculture was derived, were carried out with the now obsolete high grade Bessemer material, and prior to Dr. Robertson's experiments practically nothing was known as to the fertilising value of the new open hearth slags; the experiments in this country on raw rock phosphate were also few in number and not very conclusive in result.